DOCUMENT RESUME

ED 391 152 CS 012 342

AUTHOR Nagy, William E.
TITLE On the Role of Context in First- and Second-Language Vocabulary Learning. Technical Report No. 627.
INSTITUTION Center for the Study of Reading, Urbana, IL.
PUB DATE Nov 95
NOTE 24p.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Information Analyses (070)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Context Clues; Elementary Secondary Education; Literature Reviews; *Reading Research; *Second Language Learning; *Vocabulary Development; Vocabulary Skills; Word Recognition
IDENTIFIERS *Word Learning

ABSTRACT

The importance of context in vocabulary learning is evident from two common-sense observations: what a word means often depends on the context in which it is used, and people pick up much of their vocabulary knowledge from context, apart from explicit instruction. Available evidence supports a relatively strong version of each of these observations. Research in learning words from context reveals significant limitations of "guessing meanings from context" as a means of learning words. A single encounter with an unfamiliar word in context seldom reveals more than a fraction of the word's meaning. However, evidence can also be found that shows the limitations of decontextualized forms of vocabulary learning. Though wide reading cannot be viewed as a panacea, there is good reason to consider it a necessary condition for the development of a large reading vocabulary. Although the limits of contextual guessing must be recognized, context remains an important source of information. And although learning from context is demonstrably more difficult in a second language, second-language readers gain significant word knowledge simply from reading, and increasing their volume of reading produces significant gains in vocabulary knowledge and other aspects of linguistic proficiency. Effective use of context to disambiguate words, or to infer the meanings of unfamiliar words, depends on a variety of types of knowledge--world knowledge, linguistic knowledge, and strategic knowledge. To some extent, world knowledge and strategic knowledge can help compensate for limitations in second-language learners' linguistic knowledge. (Contains 67 references and 2 notes.) (Author/RS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 391 152

Technical Report No. 627

ON THE ROLE OF CONTEXT IN FIRST- AND SECOND-LANGUAGE VOCABULARY LEARNING

William E. Nagy
University of Illinois at Urbana-Champaign

November 1995

Center for the Study of Reading

TECHNICAL REPORTS

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

College of Education
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
174 Children's Research Center
51 Gerty Drive
Champaign, Illinois 61820

CS012342

BEST COPY AVAILABLE

CENTER FOR THE STUDY OF READING

Technical Report No. 627

ON THE ROLE OF CONTEXT IN FIRST- AND SECOND-LANGUAGE VOCABULARY LEARNING

William E. Nagy
University of Illinois at Urbana-Champaign

November 1995

College of Education
University of Illinois at Urbana-Champaign
174 Children's Research Center
51 Gerty Drive
Champaign, Illinois 61820

Abstract

The importance of context in vocabulary learning is evident from two common-sense observations: What a word means often depends on the context in which it is used, and people pick up much of their vocabulary knowledge from context, apart from explicit instruction. In this report, I will explain how the available evidence supports a relatively strong version of each of these observations, and discuss some of the instructional implications of this evidence.

Contextual variation in meaning is pervasive in natural languages, and much of this variation is irregular and/or language specific. Hence, an adequate representation of a person's knowledge of a word must include information about various aspects of the contexts in which it can be used, including the syntactic frames in which a word occurs, collocational possibilities, and stylistic level.

Research on learning words from context reveals significant limitations of "guessing meanings from context" as a means of learning words. A single encounter with an unfamiliar word in context seldom reveals more than a fraction of the word's meaning. However, evidence can also be found that shows the limitations of decontextualized forms of vocabulary learning (e.g., studying word lists, memorizing definitions). Though wide reading cannot be viewed as a panacea, there is good reason to consider it a necessary condition for the development of a large reading vocabulary.

Although the limits of contextual guessing must be recognized, context remains an important source of information for readers. And although learning from context is demonstrably more difficult in a second language, second-language readers have been shown to gain significant word knowledge simply from reading, and increasing second-language students' volume of reading has been found to produce significant gains in vocabulary knowledge and other aspects of linguistic proficiency. Effective use of context to disambiguate words, or to infer the meanings of unfamiliar words, depends on a variety of types of knowledge--world knowledge, linguistic knowledge, and strategic knowledge. To some extent, world knowledge and strategic knowledge can help compensate for limitations in second-language learners' linguistic knowledge.

ON THE ROLE OF CONTEXT IN FIRST- AND SECOND-LANGUAGE VOCABULARY LEARNING

The importance of context in vocabulary learning is evident from two common-sense observations: What a word means often depends on the context in which it is used, and people pick up much of their vocabulary knowledge from context, apart from explicit instruction. In this report, I will explain how the available evidence supports a relatively strong version of each of these observations, and discuss some of the instructional implications of this evidence.

The Pervasiveness of Polysemy

Words have a habit of changing their meaning from one context to another (Labov, 1973). Although examples come easily to mind (framing a picture is not the same thing as framing a person), the extent of this phenomenon may not be clear until one looks into a large dictionary. A sample of words from *Webster's Third New International Dictionary, Unabridged* shows that about 40% of main entries either have more than one meaning listed or belong to a set of homographic main entries.[1] There were an average of 2.3 meanings per entry, if all the subdivisions of meaning marked by numbers and letters were taken into account. Thus, the estimated 267,000 main entries in Webster's Third (Goulden, Nation, & Read, 1990) represent a total of about 600,000 meanings.

Webster's Third gives some indication of the sheer amount of polysemy in the language. However, there are two ways in which a dictionary can be said to underrepresent the extent of polysemy. First of all, dictionaries are full of very low-frequency specialized words, which tend to have only a single meaning. The number of meanings a word has is proportional to the frequency of its use. Although 60% of the words in the preceding sample had only one meaning, these words were all either derived words (*abolitiondom*, *mispunctuate*), compound entries (*butterfly clam*, *monsoon forest*), or very low-frequency words usually associated with some specialized domain of knowledge (*aurin*, *izhevsk*, *maki*). For commonly used words, multiplicity of meanings appears to be the rule.

There is another way in which dictionaries may underestimate the contextual variability of meaning in language. Green (1989) found that approximately 15% of words in naturally occurring text were used in senses not included in existing dictionaries. Fifteen percent may not sound like a very large number, but if a new meaning were added to the dictionary for 15% of the words in a substantial amount of text, there would be a massive increase in the total number of meanings represented.

Contextual Variation in Meaning and the Internal Lexicon

There is little question that a dictionary of any reasonable size provides multiple meanings and shades of meanings for large numbers of commonly used words. However, what this tells us about the internal lexicon--how word meanings are actually represented in human memory--is a matter of some debate. The multiplicity of meanings found in *Webster's Third* might tell us more about traditions of lexicography, and the compulsive habits of lexicographers, than about what is actually stored in the heads of normal speakers of the language. Some have argued that dictionaries artificially inflate the number of distinct senses that words actually have, by making distinctions finer than is necessary.

In trying to determine what distinctions of meaning are actually represented in the minds of normal speakers of the language, a distinction must be made between two types of contextual variation in meaning. Following Johnson-Laird (1987), the crucial difference is whether the contextual variability in meaning involves multiple senses in the permanent internal representation of the word, or whether the variability exists only "on-line," created in the process of comprehension.[2]

The first type of contextual variation in meaning can be called *sense selection*. In this case, a word is assumed to have two or more senses, and the effect of context is to select one of these. Homonyms--words identical in form, but with distinct and historically unrelated meanings--provide a clear-cut example of this process. The noun *bear* and the verb *bear* are clearly two distinct entries in the internal lexicon, and context allows a listener or reader to determine which is intended. This is the picture of contextual variation in meaning assumed by, and supported by, studies of on-line processing which show that multiple meanings of a word are initially activated when the word is accessed, but that within a few hundred milliseconds, contextually inappropriate meanings have been suppressed (e.g., Seidenberg, Tanenhaus, Leiman, & Bienkowski, 1982; Swinney, 1979).

For the second type of contextual variation, I will use the term *reference specification*. Reference specification describes the generation of an interpretation that is more specific than the information stored in the internal lexicon. In this case, differences in what a word conveys in two contexts is attributed to variations in the information that is added to a single unambiguous underlying representation. A prototypical case of this process is the specification of reference of pronouns. In the sentence *George Washington left his horse in the barn*, the phrase *his horse* can be interpreted as referring to George Washington's horse. However, no one would argue that the lexical entry for the word *his* (whether in a printed dictionary or an individual's memory) should include a subentry which specifies that it can sometimes mean "George Washington's." This specificity of reference is computed on-line; it is part of what the sentence as a whole conveys, but not part of the lexical representation of the word *his*.

There is no question that both processes, sense selection and reference specification, are necessary to account for the massive contextual variation that characterizes normal language use. For each process, examples can be found whereby one, and not the other, is clearly the most reasonable description. There are major differences of opinion, however, as to the scope of these two processes, and as to which of the two is the better account for any given instance of contextual variation in meaning. Differences in the relative emphasis placed on these two processes lead in turn to quite different pictures of the internal lexicon, and to quite different implications about what constitutes an effective approach to vocabulary instruction.

Some scholars believe that the internal lexicon is marked by extensive and pervasive multiplicity of meaning. Others argue that true lexical ambiguity is relative rare, and that the bulk of contextual variation evident in large dictionaries is best described in terms of reference specification. Johnson-Laird (1987) and Ruhl (1989) are examples of scholars holding to the position which attributes most contextual variation in meaning to reference specification and which, therefore, minimizes the amount of lexical ambiguity that is to be accounted for in terms of the permanent representations of words in the internal lexicon. (Green, 1989, would side with Johnson-Laird and Ruhl in attributing most contextual variation in meaning to reference specification, but would differ from them regarding other issues concerning the internal representation of words.)

According to such scholars, with the exception of the relatively few cases of true homonymity, words can be assigned a single, general meaning, and apparent variability in meaning can be explained by general rules of inference, and by knowledge of the situation to which the utterance refers. For example, a dictionary may list among the meanings of the phrase *take off* separate subentries for a sense something like "leave" (as in "He took off down the street") and "become airborne" (as in "The airplane took off"). Ruhl (1989), however, argues at length that the differences between these (and other) meanings of *take off* can be attributed entirely to contextual factors, and that a single, much more general and abstract, definition is preferable.

I advocate a different position, arguing that the internal lexicon is characterized by pervasive lexical ambiguity. This is not to deny the importance of reference specification as an important factor in

contextual variation in meaning. Sense selection and reference specification, though they are in competition as possible alternative accounts of individual cases, are not mutually exclusive phenomena. On the contrary, both play a major role in normal language use. What I wish to dismantle is the claim that, because almost all contextual variation in meaning can be attributed to reference specification, the internal lexicon consists largely of words with single, parsimonious and abstract meanings.

At issue is the extent to which the massive multiplicity of meaning seen in dictionaries can be accounted for by reference specification, and hence need not be represented by multiple entries in the internal lexicon. Ultimately, understanding the nature of the internal lexicon will depend on careful analysis of myriad cases of potential lexical ambiguity. Here I can give examples illustrating only some of the reasons why sense selection must often be chosen as the preferable account for particular cases of multiplicity of meaning.

The Irregularity of Polysemy

A distinction is often made between homonyms and polysemy. The term homonym is often used in the specific sense of a word with two (or more) meanings that are historically derived from separate sources. For example, the word *mine* has at least two completely distinct meanings (as in "The book is mine" and "coal mine") that can be traced back to different historical sources. Rather than calling this one word with two meanings, a more appropriate description might be two different words which happen to have the same spelling and pronunciation. Polysemy, on the other hand, is used here to refer specifically to cases in which the multiple meanings of a word trace from a single historical source, and in which the relationship between the meanings is, at least in principle, discernable.

Those who hold a position like that of Johnson-Laird or Ruhl would accept that true cases of homonymity should be accounted for in terms of sense selection. However, they would argue that in general, polysemy can be accounted for in terms of reference specification. In other words, if the relationship between two meanings is evident, one can be computed on-line from the other, or both can be computed from some more abstract meaning. I argue, on the other hand, that whether or not a distinction in meaning needs to be represented in the internal lexicon depends not on whether some relationship between the two meanings can be discerned, but on whether or not the relationship between the meanings is predictable.

Consider first a case in which reference specification is presumably the most appropriate account for multiplicity of meanings. The word *book* can be used to refer to a particular physical copy (*He handed me the book*) or the content (*He memorized the book*). The relationship between these two senses is regular; it extends to other types of written materials (letters, magazines, manuscripts, encyclopedias), and more generally to other forms of recorded information (e.g., *The movie was lying on the table* vs. *I remember most of the movie*). In fact, the principle extends to titles of individual works (*I left War and Peace in the bathroom* vs. *I'm writing a report on War and Peace*) and, more generally, to any word or phrase referring to entities in this general category (*I can't find what he wrote* vs. *I can't believe what he wrote*). Such contextual variability can best be described in terms of general principles for extending reference (Green, 1989; Nunnberg, 1978). Because such rules are necessary to account for the different possible interpretations of an indefinitely large number of phrases, there is no reason to postulate multiple entries for words such as *book* in the internal lexicon to cover the kind of variability in the preceding examples.

On the other hand, not all instances of polysemy can be described in such terms. The fact that two meanings of a word are obviously related does not necessarily imply that their relationship is predictable. The various metaphorical meanings of animal names in English, for example, (*dog, cat, fox, viper*, etc.) depend on metaphors that are transparent, to varying degrees. Nevertheless, these meanings are conventionalized, not fully predictable, and are not generalizable to words with similar meanings. The

adjective *canine*, for example, does not take on the same range of meanings as the noun *dog*. Hence, the kind of multiplicity of meaning represented by such conventionalized metaphors needs to be represented in the internal lexicon.

As just discussed, some of the meanings of the word *book* can be accounted for by general principles of reference specification, and need not be included as separate senses in the internal lexicon. On the other hand, there are also senses of *book* which, though their relationship to the most familiar meaning may be discernable, do not reflect a regular, productive pattern. One can imagine a connection between the usual sense of *book* and the sense it has in the phrase *a book of matches*, but this usage is not extended, as far as I know, to toothpicks of a particular brand that come in somewhat similar packages. Likewise, the use of the word *book* with reference to bridge or horse racing appears to represent a conventionalized, rather than productive, extension of meaning.

How can one determine which instances of polysemy reflect general principles of reference specification, and which are irregular and, hence, must be represented in some way in the lexicon? One way is to examine cross-linguistic differences in polysemy. If a particular instance of variability in meaning is language specific, this fact can be taken as evidence that it is likely to be irregular, and hence represented in the internal lexicon.

It must be emphasized, of course, that language specificity constitutes evidence, and not proof. In some cases, differences of contextual variation between two languages can be the result of different *rules* of sense generation. For example, the sentence *The whole dorm was studying for finals* illustrates a rule that allows the name of a place to refer to persons associated with that place. This rule operates quite freely in English, but this sentence cannot be translated literally into all languages.

However, the lack of correspondence between the range of meanings covered by words in two languages frequently reflects historical accidents--the fact that a particular metaphorical extension of meaning has become conventionalized in one language, and not in the other. Even the most abridged bilingual dictionaries demonstrate a pervasive lack of one-to-one mappings between words in two languages. The complexity of the mappings stems from a number of sources, but one of them is that much of the polysemy in any given language is conventionalized, and not fully predictable.

Some scholars have argued that the extensive contextual variation in meaning found in natural language use should be attributed primarily to reference specification. Others may argue that it should primarily be represented in terms of multiple entries in the internal lexicon. I would argue that the amount of contextual variability in meaning in normal language use is so vast that both mechanisms must be relied on quite heavily.

Polysemy and Complex Lexical Items

Much of the polysemy in English is found in complex lexical items--derived words (affixed and compound words) and idioms. Derived words make up a significant proportion of the word stock of the language. According to the analysis of *Webster's Third* by Goulden et al. (1990), there are more entries for derived words than there are for basic words. Between grades 1 and 5 (and presumably thereafter as well), the bulk of children's vocabulary growth consists of increase in the number of derived words known (Anglin, 1993).

In many cases, of course, derived words show no shift in meaning. *Quick* means the same thing in *quickly* as it does in many other contexts. In other cases, the relationship between the meaning of a complex word and the meanings of its parts may be so obscure that the complex word must unquestionably be treated as a separate lexical item. One cannot derive the meaning of *casualty* from

casual. Only an etymologist with a very active imagination can see any consistency to the meaning of *ob* in the contemporary meanings of *observe*, *obstruct*, and *obtain*.

Most derived words, however, occupy a middle ground. The meaning of the whole is related to, but underdetermined by, the meanings of the parts. For example, the compounds *snowman*, *fireman*, and *policeman* reflect three different relationships between the first and second parts. To represent the meanings fully and explicitly, longer phrases would be necessary, something like man-made-of-snow, man-who-puts-out-fires-as-an-occupation, and man-who-belongs-to-the-police-force.

The vocabulary of English (and presumably, that of many other languages) is pervasively semi-transparent. That is, it contains vast numbers of derived words which are easily learnable, because their meanings are obviously related to those of their parts; but which also show economy of expression, in that they convey more information than the parts alone imply.

At question is how such words are to be represented in the internal lexicon. Ruhl (1989) represents the position that the conventional meanings of such words can be treated in terms of sense generation. That is, he admits that the parts of *snowman* underdetermine its meaning, but argues that such underdetermination is typical at all levels of language. That is, the meaning of any sentence (or any combination of words, for that matter) is not fully determined by the meanings of the parts; rather, it is a complex interaction of the meanings of the individual words with the rules of syntax and the listener's or reader's knowledge of the world.

I agree that underdetermination is characteristic of normal language use, and that reference specification is therefore an essential part of the process of language comprehension. However, that does not necessarily mean that complex words should (or can) be assigned no meanings beyond the meanings of their parts. In many cases, it is simply not possible to determine the meaning of a complex word from the meanings of its parts. The meanings of *foxtrot*, or *shiftless*, or *condescend*, are not what their components would lead the learner to believe.

Even in cases in which the meaning of a complex word appears to be predictable from its parts, that predictability does not rule out the possibility that this meaning has become conventionalized. For example, in English, *snowman* is normally used to refer to figures made of snow, not to people who plow snow from the streets or who shovel snow from sidewalks. *Fireman* is used for people who put out fires, not for arsonists. In some theoretical frameworks, knowledge of these conventions may be considered part of world knowledge, rather than linguistic knowledge. However, as far as language pedagogy is concerned, I would say that knowing which of the possible meanings of fireman is conventional in English can be crucial for text comprehension, and hence is something that the learner needs to know about the word.

Should the lexical entry for *iceman* specify that this refers to a person who delivered ice to homes? Ruhl's argument would presumably be that the term *iceman* could be, and probably has been, used to refer to a statue of a man made of ice, or someone who never showed emotions, or a bronze-age hunter found frozen in a glacier in the Alps. Therefore, the meaning of the compound word *iceman* can be reduced to the meaning of *man*, *ice*, and an unspecified relationship between the two. I would respond that, for pedagogical purposes, how general a meaning one should postulate for iceman depends on how this word has actually been used. For the word *iceman*, perhaps a good case could be made that a more general meaning is warranted. One should not, on the other hand, turn an ESL student loose with the impression that *software* is as likely to refer to lingerie as to computer programs.

Semantic irregularity is by no means confined to single words; much of the polysemy found in English is associated with idioms. Idioms are by definition larger-than-word units whose meanings are not a

BEST COPY AVAILABLE

regular function of the meanings of the component parts. The meaning of *by and large*, for example, cannot be computed from the meanings of the three words that make up this expression.

According to Goulden et al. (1990), the number of compound entries (i.e., entries containing internal spaces or hyphens) is greater than the number of entries for basic words. According to Anglin's (1993) analysis, more than half of the compound entries are idioms, that is, blatantly semantically irregular.

However, the term *idiom* may not reflect the full extent of semantic irregularity in units larger than individual words. The term *idiom* calls to mind colorful, metaphorical phrases such as *kick the bucket*. However, semantic irregularity is more widespread. One also needs to include phrasal verbs (*break out, turn up, take off*, etc.), cliches, proverbs, and so on. Bolinger (1976) (along with Chafe, 1968, and Makkai, 1972) argues that "idiomaticity is a vastly more pervasive phenomenon than we ever imagined."

As is the case with derived words, semi-transparency is widespread among idioms. *To lose one's cool* does not mean exactly what one might compute from the meanings of the individual words, but neither is the meaning of this phrase completely unrelated to the meanings of the parts.

As in the case of derived words such as *iceman*, it could be argued that idioms simply reflect the general principle that language underdetermines meaning. However, not all of the semi-transparency seen in idioms is simply the underdetermination typical of all language; much of it is conventionalized. Sometimes the conventionalization may not be immediately apparent. Take the phrase *vegetable soup*. At first glance, this might seem to be a completely transparent phrase. However, consider the following thought experiment: In the soup section of a grocery store, you modify the labels by covering all names, but leaving pictures and lists of ingredients visible. You find a learner of English from some sufficiently different culture, and having explained the meanings of the words *vegetable* and *soup*, ask this learner to bring out all, and only, the cans of "vegetable soup." The question is whether the knowing the meanings of *vegetable* and *soup* will be sufficient to exclude, say, cream of broccoli soup, French onion soup, or tomato soup, and to include vegetable soup with beef stock.

The Internal Lexicon and Language Pedagogy

Our language is filled with polysemous words, and with derived words, phrases, and idioms which appear to be semantically transparent, but which carry some conventionalized meaning not predictable from their parts. Different pictures of the internal lexicon emerge, depending on the relative emphasis one places on sense selection and reference specification in accounting for the pervasive contextual variation in meaning. These different pictures have divergent implications for language pedagogy and, in particular, for the role of definitions in promoting vocabulary growth.

Reliance on brief, decontextualized definitions to promote vocabulary growth presupposes the parsimonious model of the lexicon which maximizes the role of reference specification and minimizes the role of sense selection. I will outline two types of arguments against taking a parsimonious model of the internal lexicon as a basis for language pedagogy. The first concerns the number of words that have to be learned, and the second concerns the relationship between definitions and word knowledge.

The importance of definitions in language learning depends in part on the rate at which learners are estimated to acquire words. The number of words that can be learned in a year through memorizing definitions is presumably somewhere in the hundreds. If the average student's rate of vocabulary growth is about 1,000 words per year, ambitious definition-based instruction might account for a substantial proportion of that growth. If, on the other hand, an average student's rate of vocabulary growth is two or three times that, as has been argued by some (Anglin, 1993; Miller & Gildea, 1987; Nagy & Anderson, 1984; Nagy, Anderson, & Herman, 1987), the contribution of definition-based learning to

overall vocabulary growth may be relatively minor, and other avenues of acquisition would have to account for the bulk of an individual's lexical development.

The 1,000-word-per-year estimate of vocabulary growth (Goulden et al., 1990) presupposes an unjustifiably parsimonious conception of the lexicon. Most crucially, no provision was made in this estimate for multiple meanings among basic words. (Proposals for vocabulary instruction focusing on a limited set of high-frequency words, e.g., Coady, Magoto, Hubbard, Graney, & Mokhtari, 1993, likewise do not acknowledge the fact that the 2000 most frequent words in the language are also the most polysemous.)

The 1000-word-per-year estimate also relies on a conservative criterion for determining the inclusion or exclusion of derived words. Compound entries (entries including internal spaces or hyphens) were excluded from the estimate regardless of the degree of semantic transparency. In fact, compound entries were excluded even when the first member of the compound did not have a separate entry in the dictionary. Proper words--that is, words listed in *Webster's Third* as usually or sometimes capitalized--were also excluded, even though this category includes not just proper names, but a variety of words, even high-utility words such as the names of the days of the week and names of months that are essential for any language learner.

One criticism of reliance on definition-based instruction for promoting vocabulary growth, then, is that such instruction can cover only a fraction of the vocabulary which most students acquire annually. Furthermore, given that some students learn vocabulary at twice the average rate or faster--easily more than 4,000 words per year--definition-based learning cannot be the basis of their success.

Arguments against definition-based learning as a major mode of vocabulary growth can also be based on the nature of definitions, and their relationship to the knowledge of words that is actually used in the process of language comprehension. If a word is assigned a single sense to cover a wide range of contextual variants in meaning, this sense must necessarily be general and abstract. Ruhl (1989) argues that word meanings must be quite abstract and general to account for the range of contextual variation in meaning found in dictionaries. Such meanings are necessarily quite different from what people are normally aware of when they reflect on word meanings, and in fact may even be "beyond conscious comprehension" (p. 22). In some cases, "words and their evoked effect in a particular sentence may seem to totally part company" (p. 81). Pedagogically useful definitions, on the other hand, must have some discernable relationship to the effect a word evokes in a sentence.

Radical reliance on reference specification is thus a two-edged sword. On the one hand, it makes definition-based instruction more plausible by reducing the number of definitions that need to be learned. On the other hand, it reduces the plausibility of definition-based instruction by requiring more abstract or general definitions, which are, therefore, less pedagogically useful.

Brown, Collins, and Duguid (1989) argue that definitions are ineffective instructionally because they are abstract and decontextualized, whereas "real" word knowledge is inherently situated. The abstract definitions that must be postulated to account for the range of contextual specific meanings have no relationship to the learner's actual knowledge of words. "Because it is dependent on situations and negotiations, the meaning of a word cannot, in principle, be captured by a definition, even when the definition is supported by a couple of exemplary sentences" (p. 33). As Watson and Olson (1987) argue, the very idea that words have abstract, contextually invariant meanings is a myth about language, fostered by the need for written language to communicate apart from a shared situational context, and the desire of scientists to achieve a level of precision in their terminology not afforded by everyday language use.

Some theoretical accounts exclude from word meanings any information that can be considered world knowledge rather than linguistic knowledge. Green (1984), for example, following Putnam (1975), argues that natural kind terms (as well as most words, for that matter) should be treated as analogous to proper names: They do not have meaning as such, but simply refer by convention to categories whose content is a matter of world knowledge rather than linguistic knowledge. (In other words, no analytic statements can be made about dogs.)

Whatever the theoretical status of such arguments, the learner of English must still link information in some way to words, whether the words are proper names such as *George Washington* or natural kind terms such as *dog*, if the learner is to make sense of text containing the words. There may be theoretical reasons to distinguish linguistic knowledge from world knowledge; but I would not recommend that a teacher avoid mention of trunks in a discussion of the word *elephant*, on the grounds that having a trunk is not a logically necessary property of elephants, but only a contingent fact true in some of many possible worlds. Nor can a teacher refuse to tell students whether *fireman* more typically refers to "firefighter" or to "arsonist" on the grounds that this is a matter of encyclopedic knowledge and not word meaning.

Another implication of the gulf between the abstract definitions of a parsimonious lexicon and what words actually convey in a sentence is the greater demands that are placed on contextual inferencing. Heavy reliance on reference specification requires contextual inferencing every time a word is encountered. An appeal to sense selection, on the other hand, assumes that some of the contextual inferences involved in comprehension have been conventionalized or routinized, so that the meaning of a word or phrase does not always have to be computed from scratch every time it is seen. Thus, the relative weight one places on reference specification and sense selection can be seen as a trade-off between memory and on-line computation (Bolinger, 1976).

Emphasis on definitions as a means of promoting vocabulary growth is often seen as opposing reliance on guessing meanings from context. Proponents of definition-based instruction often justify their position by pointing out the inadequacies of natural context as a source of information about word meanings, just as proponents of vocabulary growth through reading emphasize the limitations of definitions. It is clear that both definitions and context have substantial weaknesses as sources of information about words; but in emphasizing the limitations of context as a potential source of information, proponents of definition-based instruction put themselves in a paradoxical position. A definition-based approach to vocabulary building, because it must assume a small number of relatively abstract definitions, is more dependent on contextual inferencing than a model which assumes that much contextual variation in meaning is stored in memory. With a parsimonious model of the lexicon, every time the reader or listener encounters a derived word, idiom, or potentially polysemous word (this covers just about any word), he or she must use context, not just to choose which meaning is intended, but to construct a meaning. In this regard, the definition-based model requires more faith in the informativeness of context than does a model in which multiple meanings of a word can be built up in memory through repeated exposures to the words in context.

The Role of Context in Vocabulary Acquisition

One of the common-sense observations mentioned at the beginning of this chapter was that people pick up much of their vocabulary knowledge from context, apart from explicit instruction. In this general form, the statement may not be controversial, but there are substantial differences of opinion over the size and importance of the role that learning from context plays in vocabulary acquisition.

The relative importance of context as an avenue of vocabulary acquisition can be considered in terms of both breadth of vocabulary knowledge--sheer number of words learned--and depth of vocabulary knowledge--the amount and quality of knowledge about individual words.

Breadth of Vocabulary Knowledge

In terms of breadth of vocabulary knowledge, the relative importance of learning from context depends on three numbers: The total amount of vocabulary growth in a given period of time (say a year), the amount of growth that can be attributed to vocabulary instruction, and the amount of vocabulary growth that can be attributed to learning from context. Reliable information is difficult to find for all three of these numbers, but this has not hindered me or other researchers from making relatively specific claims.

Published estimates of the average annual vocabulary growth of monolingual school children vary widely, from about 1,000 words a year to as many as 5,000 (Miller & Gildea, 1987). The higher estimates are, for the most part, based on studies that are demonstrably flawed (Lorge & Chall, 1963). On the other hand, the smallest estimates, as I have already argued, also rest on highly questionable assumptions and criteria. Anglin (1993), representing what I would consider a recent and reasonable analysis, estimates children's rate of growth for "psychologically basic vocabulary" as being about 3,000 words per year between grades 1 and 5.

How much vocabulary growth can be attributed to vocabulary instruction? Observations in school suggest that the number is in the low hundreds at best, if a relatively restrictive definition of vocabulary instruction is adopted. Furthermore, much of the instruction observed is of a type that leads only to a superficial level of word knowledge (Stahl & Fairbanks, 1986). On the other hand, it is not clear how high the number would go if one included every time a word was explained, and every time a child saw or heard a definition.

A series of studies at the Center for the Study of Reading examined incidental learning from context, that is, the amount of word knowledge gained when students are reading natural text, without knowing that they will be tested on their knowledge of words from the text, and when word knowledge is tested without the text available. This research has established the odds of an elementary or middle school monolingual reader learning a word from a single encounter in context at somewhere between one in twenty and one in seven, depending on the type of text and the delay between reading and the time word knowledge is assessed (Herman, Anderson, Pearson, & Nagy, 1987; Nagy et al., 1987; Nagy, Herman, and Anderson, 1985; Shu, Anderson, & Zhang, 1995). A similar rate of learning was found with text read aloud to sixth grade students (Stahl, Richek, & Vandevier, 1991). The lowest rate of learning (1 unfamiliar word in 20) was found when students were tested a week after having read the text (Nagy et al., 1987). This rate might be taken as the most accurate measure of long-term learning. On the other hand, it also reflects an average over a variety of texts, including some difficult expositions for which there was no learning at all, and other texts for which the rate of learning was substantially higher. (Two of the twelve texts used in this study, both narratives, showed a long term learning rate of 14%, or about one unfamiliar word in eight.

This rate of learning from context has been interpreted two ways. On the one hand, it has been taken as confirming other research showing context as a very unreliable source of information about word meanings (Beck, McKeown, & McCaslin, 1983; Schatz & Baldwin, 1986). Students are often encouraged to use context as a means of guessing the meanings of unfamiliar words, but if they have only a one-in-twenty chance of success, traditional instruction in context use is setting up completely unrealistic expectations.

On the other hand, this apparently low rate of learning from context has also been taken as evidence that context plays a major role in vocabulary growth. This interpretation depends on the cumulative gains that are believed to result over time. Average students are estimated to read somewhere in the neighborhood of a million words of text a year (Anderson, Wilson, & Fielding, 1988). If two percent of these words were unknown, this would amount to 20,000 unknown words per year. If one in twenty of these were learned, the annual gain would be 1,000 words per year.

The actual gains from learning from context depend on a number of factors which are difficult to estimate reliably. Volume of reading is one such factor; there are huge individual differences in the amount that children read, from almost nothing to 10 million words a year or more. The percentage of words that are unknown is also subject to debate. There is some evidence that as few as 1 percent of words in grade-level text are unknown to average readers (Carver, 1994), and that students reading self-selected books at or below their grade level gain little vocabulary knowledge (Carver & Leibert, 1995). However, words need not be completely unfamiliar to students for them to gain significant knowledge from context (Nagy et al., 1985; Stallman, 1991).

The strongest evidence for the role of context in learning vocabulary comes from studies in which increasing students' volume of reading has lead to measurable gains in their vocabulary knowledge and other measures of language proficiency (Elley, 1991). Significantly, the strongest evidence of the benefits of reading for vocabulary growth has been for second-language students. probably because such students are encountering a higher proportion of unfamiliar words.

As far as breadth of vocabulary knowledge is concerned, then, even the most conservative interpretation of the research would have to attribute at least as much vocabulary growth to incidental learning from context as to instruction. I am more inclined to say that overall, the literature shows that the bulk of the words a child learns are gained from context, and that for children with above-average rates of vocabulary growth (which may amount to learning thousands of words per year more than their peers), the vast bulk of this growth can be attributed to wide reading, and to other forms of exposure to rich language input (Krashen, 1989).

Depth of Word Knowledge

Knowing a word involves much more than knowing a definition. Besides information about a word's meaning, word knowledge is generally recognized as including a number of other components--for example, the syntactic frames in which a word occurs, the word's collocational potential, its register, potential morphological relationships (what prefixes and suffixes it occurs with), and its semantic relationships with other words. People possess other kinds of knowledge about words as well, for example, the frequency with which a word occurs in the language.

Definition-based learning typically involves memorizing (or attempting to memorize) brief definitions representing only a single meaning of the word to be learned, and hence leads to only a shallow level of word knowledge. Reviews of research clearly indicate that instruction relying on definitions alone does not increase comprehension of text containing the instructed words (Graves, 1986; Mezynski, 1983; Stahl & Fairbanks, 1986). Comprehension of text containing difficult words can sometimes be increased by instruction on the difficult words in the text, if beyond providing definitions, the instruction involves multiple exposures to the word in context, and requires deep processing of information about the words (Stahl, 1986). However, vocabulary instruction of the sort that has been demonstrated to increase reading comprehension is relatively rare in schools. Hence, even for those words which have been covered in some form of vocabulary instruction, most of students' knowledge of those words must be attributed to encounters with the words in context.

No single encounter with a word, whether in instruction or in the course of reading or listening, can lead to any depth of word knowledge. Even the richest programs of vocabulary instruction require seven or more encounters with a word to produce "ownership" of the word (McKeown, Beck, Omanson, & Pople, 1985). Definitions might serve as a helpful initiating event in learning some words (McKeown, 1993), or may help students organize and articulate their developing knowledge of a word. But in either case, the bulk of word learning occurs as a word is encountered repeatedly in context. For this to happen, the student must be exposed to large amounts of comprehensible input.

Second Language Vocabulary Acquisition

How much of a role does context play in the acquisition of vocabulary by second-language learners? A variety of reasons can be found for arguing that context plays a less important role, and explicit instruction (i.e., definitions) a relatively greater role, in the vocabulary growth of second language learners. For one thing, second-language learners will be less effective than native speakers at using context, at least until they achieve a fairly high level of L2 proficiency (Cziko, 1978; see below). Second language learners usually have to learn at a rate faster than the "natural" rate of first language acquisition. In addition, early stages of second language acquisition involve a relatively small number of high frequency words, for which there is a greater pay-off instructionally.

On the other hand, reasons can also be found for arguing that second-language learners need to, and can, use context as an important means of vocabulary growth. First, in general second-language readers encounter unfamiliar words at a greater rate than first-language readers. Use of context is a crucial strategy for dealing with text containing unfamiliar words. Cross-linguistic differences in multiple meanings of words also means that second language readers will encounter unfamiliar meanings more often than first-language readers. Most crucially, Elley's (1991) survey of "book flood" studies shows that second-language learners tend to show even greater benefits from increases in volume of reading than do first-language learners.

My point here has not been to argue that there is no place for using definitions in vocabulary instruction. Rather, it has been to argue that context--that is, massive exposure to comprehensible input--is absolutely necessary for language acquisition.

Types of Knowledge that Contribute to Contextual Inferencing

It is been recognized at least since Katz and Fodor's (1963) attempt to formulate a model of context effects on word meaning that any type of knowledge, linguistic or extralinguistic, can potentially serve to disambiguate a word. For the present, it may be useful to distinguish three categories of knowledge that contribute to context-based inferences: linguistic knowledge, world knowledge, and strategic knowledge.

Linguistic Knowledge

Much of the information provided by context lies in the linguistic structure of the context, and its use can depend on the learner's knowledge of this structure. Any type of linguistic knowledge can potentially contribute to contextual inferences. Here I will consider syntactic knowledge, vocabulary knowledge, and word schemas, that is, knowledge of what constitute possible word meanings in a language.

Syntactic knowledge. The meaning of a word determines its syntactic behavior. Conversely, according the syntactic bootstrapping hypothesis (Landau & Gleitman, 1985), the syntactic behavior of a word provides crucial information about its meaning. Although the mappings between semantic categories and syntactic constructions are complex and often irregular, they are consistent enough to provide significant information to learners even at early stages of language acquisition.

Very young children are able to use part of speech and other syntactic information as clues to the meanings of new words. Brown (1957) showed that the use of a novel word as a noun or verb (*Here's a sib* vs. *He was sibbing*) led preschool children to different inferences about its meaning. Naigles (1990) found that 2-year-olds would make different inferences about the meanings of a new verb depending on whether it was used transitively or intransitively. Katz, Baker, and MacNamara (1974) found that 2-year-olds would make different inferences about the meaning of a new word ("dax") applied to a new

doll, depending on the presence or absence of an indefinite article. Hearing the sentence "This is a dax," the children would generally assume that dax must mean some kind of doll, and apply the term to other similar dolls. Hearing the sentence "This is dax," the children would assume it was a name for that individual doll, and were less like to apply it to other dolls.

This last example is important in that it illustrates the use of language-specific syntactic information. Languages differ in the nature of their mappings between meaning and syntactic behavior. Second-language learners can, therefore, be at a disadvantage with respect to first-language learners' ability to utilize syntactic information in two ways: First, they simply may not know a given syntactic construction, and hence not be able to use the information it offers. Second, their first language syntactic knowledge may influence the hypotheses they make about the meanings of unfamiliar words encountered in a second language. Nagy, McClure, and Mir (1995) found that even bilinguals who had achieved a high level of proficiency in their second language sometimes used first-language syntactic patterns as a basis for determining the meanings of new words.

Word schemas. Another type of linguistic knowledge that contributes to inferring word meanings from context is constraints on possible word meanings. As Quine (1960) and others since have argued, the number of meanings for an unfamiliar word that are consistent with any given context is potentially infinite; only if there are some restrictions on the hypotheses that the learner must consider is word learning possible.

Even young children have a sense of what constitutes a plausible word meaning. For example, Markman and Hutchinson (1984) found that children 2 to 5 years old, when asked which goes with a cow, were equally likely to choose *milk* (a thematic associate) as they were to choose *pig* (a taxonomic associate). However, if a cow was labelled with the nonsense word *fep*, and children were asked to pick another fep, they were more likely to choose the pig than the cow. This indicates that the children had implicit knowledge about possible word meanings: There is more likely to be a word that includes both cow and pig than there is to be a word that includes both cow and milk, despite the strong association between the members of the latter pair.

Markman and Hutchinson (1984) discuss such implicit knowledge in terms of constraints on possible word meanings, and suggest that such constraints may constitute part of children's innate capacity for language acquisition. The status of such knowledge as universal, innate constraints is debatable (Carey, 1983; Nelson, 1988), but there is evidence that both children and adults have some sense of what constitutes a possible, or at least plausible, word meaning. Nagy and Scott (1990) use the term *word schemas* for such knowledge; they, and Nagy and Gentner (1990) present evidence that some knowledge about possible word meanings is language specific. For example, English, unlike Japanese, has numerous monomorphemic verbs which incorporate information about the manner in which an action is performed (e.g., *strut*, *slink*, *swagger*, *stride*, *stroll*, *limp*, *march*). Speakers of English accept new verbs that specify the manner in which an action is performed. On the other hand, monomorphemic verbs in English do not readily incorporate the meanings of the patient role. That is, it would be inconsistent with the semantic patterns of English for the word *tube* to come to be used as a verb meaning "to watch television."

Vocabulary knowledge. To infer the meaning of any particular word encountered in context, it is helpful to know the meanings of the words around it. In Sheffelbine's (1990) study of the process of inferring word meanings from context, one of the main obstacles facing learners trying to infer the meaning of a word was lack of knowledge of other words in the context. This is a problem likely to be faced by many second-language readers (García, 1991). This is another way that linguistic proficiency influences how successfully a learner can use context.

Thus, various types of linguistic knowledge, some of them quite subtle, are involved in shaping the hypotheses that learners make about the meanings of new words. It is therefore not surprising that second-language learners must achieve a high level of proficiency before their use of context approaches that of native speakers (Cziko, 1978).

World Knowledge

The context that enables a person to select the appropriate sense of an ambiguous word, or to infer the meaning of an unfamiliar word, must be construed to include the speaker's knowledge of the world, including his or her knowledge of the speech situation. Bolinger (1965) illustrates this with the sentence *Bessie is a bitch*, which in some circumstances might be disambiguated (i.e., as to whether *Bessie* refers to a human or canine) on the basis of what one knows about the personality and speech habits of the speaker.

In some cases, learning a word from context simply requires determining which of several already familiar concepts the word refers to. In other cases, one may acquire a new concept in the process of learning the word which labels it. Not surprisingly, research on learning word meanings from context has shown that it is harder to learn a word for a new concept than a word which is simply a new label for a familiar concept (Nagy et al., 1987; Sheffelbine, 1990; Shu et al., 1995).

Because learning word meanings from context includes the acquisition of new contexts, hypotheses about the meaning of a new word may be constrained by the learner's theories about relevant domains of knowledge (Carey, 1983). For example, if I encounter an unfamiliar word that is apparently used to refer to some type of animal, my hypotheses about its meaning will be constrained in part by my knowledge of biology.

Given the emphasis that has been placed in the last few decades on the role of knowledge in text comprehension, the importance of world knowledge in contextual effects may seem little more than common sense. There are two points, however, which I think are worth underlining in this connection.

The first is the strength of the effects of world knowledge. Nagy et al. (1987) found conceptual difficulty to be a stronger predictor of ease of learning from context than any other word property they considered, including length, morphological complexity, abstractness or concreteness, estimated informativeness of the word's context, and overall frequency in the language. Diakidoy (1993) examined the effects of several factors on sixth-grade students' ability to learn word meanings from context, including strength of contextual support (contexts containing an explicit clue to the meaning of a word were compared with natural, implicit contexts), and students' familiarity with the topic of the passage, as represented by their knowledge of domain-related words not occurring in the passage. The former was found to have a significant effect in only one of two experiments; the latter had a significant effect in both experiments, and accounted for a substantially greater proportion of variance. Both these studies indicate that learners' prior knowledge has a more powerful effect on learning from context than do properties of words or texts not directly related to prior knowledge.

A second point about the role of world knowledge in learning from context that should be stressed is its special significance for second-language learners. Second-language learners are often at a distinct disadvantage as far as linguistic context is concerned (Cziko, 1978). On the other hand, adult second-language learners may possess substantial knowledge not available to younger first-language learners. Parry's (1993) study of a Japanese graduate student's acquisition of vocabulary while studying in the United States illustrates this point. This student was far more successful at acquiring vocabulary in a particular domain than would be expected on the basis of other research on inferring word meanings from context. Parry attributes this student's success to two factors: the student's strategic capability as an adult learner, and the fact that the context involved consisted of multiple, extended texts on a topic

in which the student was developing rich and extensive knowledge. It is interesting to note, however, that Parry's student still experienced difficulty using linguistic (syntactic and morphological) information provided by the context.

Strategic Knowledge

A third category of knowledge that contributes to effective use of context is strategic knowledge. Strategic knowledge is usually defined as involving conscious control over cognitive resources. Since learning from context often occurs without special attention, or even any awareness that a word is being learned, strategic knowledge cannot be said to be necessary for acquiring word meanings. Nevertheless, it is also sometimes the case that readers are aware of encountering an unknown word, and make deliberate attempts to figure out its meaning.

In several studies, training students in the use of context has enhanced students' ability to infer the meanings of unfamiliar words, both for first- (Buikema & Graves, 1993; Jenkins, Matlock, & Slocum, 1989; Sternberg, 1987) and second- (Huckin & Jin, 1987) language learners. Such results make it clear that the process of using information from context is at least partially under conscious control, and offer some promise that students' ability to make use of contextual information can be enhanced through instruction.

The success of these studies highlights the potential efficiency of focusing on strategic knowledge. Producing major gains in world knowledge, or in linguistic proficiency, is the work of months and years. Strategic knowledge, on the other hand, offers the promise of large gains in learning for a relatively small investment of instructional time.

Research on comprehension strategies offers much important information about strategy instruction that could be applied to teaching word-learning strategies. The fact that reading strategies appear to transfer from one language to another (e.g., Cummins, 1991; Langer, Bartholome, Vasquez, & Lucas, 1990) is also promising.

However, at this point, little is known about how to teach students to use context effectively. and not all studies that attempt to do so have had positive results (e.g., Kranzer & Pikulski, 1988). There is also the problem of a potential trade-off between attention to individual word, and comprehension of text. Stallman (1991) found that none of several methods of drawing students' attention to words (e.g., underlining the words in the text, or asking students to underline words unfamiliar to them) had any impact on word learning, but that such attempts to focus students' attention on words had a significant negative impact on comprehension.

In discussing the role of strategic knowledge in learning vocabulary from context, it is important to distinguish between deriving words from context--a deliberate and conscious process--and incidental learning. There are important differences between the deliberate attempt to infer the meaning of a new word on the basis of a single context, and the cumulative effect of multiple exposures to a word when the focus is on the comprehension of text. Little if anything is known about the relative contributions of the two to vocabulary growth. Stallman's (1991) results call into question the efficacy of deliberate attempts to focus students' attention on word learning; also, there is no evidence, to date, that instruction increasing strategic learning from context generalizes to free reading.

I would suggest that strategy instruction concerning the use of context focus on the goal of reading text containing unfamiliar words with the highest level of comprehension, and the minimum level of frustration, rather than on learning the words. Although I am not aware of research specifically backing up this suggestion, the idea has several plausible motivations. First, the possibility of a trade-off between word learning and comprehension makes desirable a focus on comprehension. Second, a focus on

comprehension sets a more modest and attainable goal, consistent with the limitations of context. It is often not possible to infer the meaning of an unfamiliar word from the context found in normal text (Beck et al., 1983). However, it is usually possible to get the gist of a text even if it contains an unfamiliar word. Third, the goal of comprehension may be more motivating for students than the goal of coming up with definitions. Fourth, instruction which enables students to read more challenging text with a lower level of frustration can potentially increase the volume of exposure to comprehensible input, by making the input more comprehensible, and making students more willing to read challenging material.

Conclusion

Contextual variation in meaning is pervasive in natural languages, and much of this variation is irregular and/or language specific. Hence, an adequate representation of a person's knowledge of a word must include information about various aspects of the contexts in which it can be used, including the syntactic frames in which a word occurs, collocational possibilities, and stylistic level.

Acquiring vocabulary knowledge from context depends both on linguistic and extralinguistic knowledge. The notion of context cannot be restricted to the textual neighborhood of a word. Inferring the meaning of a word from context involves a relationship between the situation model (the reader/listener's model of meaning of the text) and the text model, as well as knowledge of the nature of the possible mappings between the two. These, in turn, draw on the learner's world knowledge, his or her theory of the conceptual domain to which the word belongs, and knowledge about the way in which the relevant part of the lexicon is organized. Knowledge about reading and strategies for making sense of text are also involved.

First-language acquisition research indicates that vocabulary is learned at a rate greater than could be accounted for by any sort of formal instruction. Although the probability of learning individual words through a single encounter in context is relatively low, the cumulative effects of learning from context can account for substantial vocabulary growth. Furthermore, increasing learners' exposure to written language has been documented to produce gains in language proficiency. Whereas learning from context is demonstrably more difficult in a second language, second-language readers have been shown to gain significant word knowledge simply from reading, and increasing second-language students' volume of reading has been found to produce significant gains in vocabulary knowledge and other aspects of linguistic proficiency.

In discussions of the role of context in vocabulary learning, two important distinctions must be observed. One is between incidental learning and the deliberate use of context to infer the meanings of unfamiliar words. It has been argued that the bulk of vocabulary growth must be attributed to incidental learning. Although deliberate use of context to infer the meanings of new words is an essential reading strategy, any instruction in such a strategy should be based on recognition of the fact that natural context is often relatively uninformative.

A second important distinction to be observed in the discussion of context is between context as a source of information about word meanings, and meaningful encounters with words in context (i.e., comprehensible input) as a necessary means of developing internal representations of words that go beyond abstract, decontextualized verbal definitions. Although there are occasions when explanations of word meanings are appropriate, only sustained exposure to comprehensible input can lead to an adequate level of vocabulary growth.

References

Anderson, R. C., Wilson, P., & Fielding, L. (1988). Growth in reading and how children spend their time outside of school. *Reading Research Quarterly, 23*, 285-303.

Anglin, J. M. (1993). *Vocabulary development: A morphological analysis.* Monographs of the Society for Research in Child Development, Serial No. 238, Vol. 58, No. 10.

Beck, I. L., McKeown, M. G., & McCaslin, E. S. (1983). Vocabulary development: All contexts are not created equal. *Elementary School Journal, 83*, 177-181.

Bolinger, D. (1965). The atomization of meaning. *Language, 41*, 555-573.

Bolinger, D. (1976). Meaning and memory. *Forum Linguisticum, 1*, 1-14.

Brown, R. (1957). Linguistic determinism and part of speech. *Journal of Abnormal and Social Psychology, 55*, 1-5.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*, 32-42.

Buikema, J. L., & Graves, M. F. (1993). Teaching students to use context cues to infer word meanings. *Journal of Reading, 36*, 450-457.

Carey, S. (1983). Constraints on the meanings of natural kind terms. In T. B. Seiler & W. Wannenmacher (Eds.), *Concept development and the development of word meaning* (pp. 126-143). Berlin: Springer-Verlag.

Carver, R. P. (1994). Percentage of unknown vocabulary words in text as a function of the relative difficulty of the text: Implications for instruction. *Journal of Reading Behavior, 26*, 413-437.

Carver, R. P., & Leibert, R. E. (1995). The effect of reading library books at different levels of difficulty upon gain in reading ability. *Reading Research Quarterly, 30*, 26-48.

Chafe, W. (1968). Idiomaticity as an anomaly in the Chomskyan paradigm. *Foundations of Language, 4*, 109-125.

Coady, J., Magoto, J., Hubbard, P., Graney, J., & Mokhtari, K. (1993). High frequency vocabulary and reading proficiency in ESL readers. In T. Huckin, M. Haynes, & J. Coady (Eds.), *Second language reading and vocabulary learning* (pp. 217-226). Norwood, NJ: Ablex.

Cummins, J. (1991). Interdependence of first- and second-language proficiency in bilingual children. In E. Bialystock (Ed.), *Language processing in bilingual children*. Cambridge, England: Cambridge University Press.

Cziko, G. A. (1978). Differences in first- and second-language reading: The use of syntactic, semantic and discourse constraints. *Canadian Modern Languages Review, 34*(3), 473-489.

Diakidoy, I. A. (1993). *The role of reading comprehension and local context characteristics in word meaning acquisition from context.* Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

Elley, W. (1991). Acquiring literacy in a second language: The effect of book based programs. *Language Learning, 41*, 375-411.

García, G. E. (1991). Factors influencing the English reading test performance of Spanish-speaking Hispanic students. *Reading Research Quarterly, 26*, 371-392.

Graves, M. F. (1986). Vocabulary learning and instruction. In E. Z. Rothkopf & L. C. Ehri (Eds.), *Review of research in education* (Vol. 13, pp. 49-89). Washington, DC: American Educational Research Association.

Green, G. M. (1984). *Some remarks on how words mean* (Tech. Rep. No. 307). Urbana-Champaign: University of Illinois, Center for the Study of Reading.

Green, G. M. (1989). *Pragmatics and natural language understanding*. Hillsdale, NJ: Erlbaum.

Goulden, R., Nation, P., & Read, J. (1990). How large can a receptive vocabulary be? *Applied Linguistics, 11*, 341-363.

Herman, P., Anderson, R. C., Pearson, P. D., & Nagy, W. (1987). Incidental acquisition of word meanings from expositions with varied text features. *Reading Research Quarterly, 22*, 263-284.

Huckin, T. N., & Jin, Z. (1987). Inferring word-meaning from context: A study in second language acquisition. In F. Marshall, A. Miller, & Z. Zhang (Eds.), *Proceedings of the Third Eastern States Conference on Linguistics*. Columbus: The Ohio State University.

Jenkins, J., Matlock, B., & Slocum, T. (1989). Two approaches to vocabulary instruction: The teaching of individual word meanings and practice in deriving word meaning from context. *Reading Research Quarterly, 24*, 215-235.

Johnson-Laird, P.(1987). The mental representation of the meanings of words. *Cognition, 25*, 189-211.

Katz, J. J., & Fodor, J. A. (1963). The structure of a semantic theory. *Language, 39*, 170-210.

Katz, N., Baker, E., & MacNamara, J. (1974). What's in a name? A study of how children learn common and proper nouns. *Child Development, 65*, 469-473.

Kranzer, K., & Pikulski, J. (1988). *The effects of instruction on incidental word leaning and ability to derive word meaning*. Paper presented at the National Reading Conference, Tucson, AZ.

Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *The Modern Language Journal, 73*, 445-464.

Labov, W. (1973). The boundaries of words and their meanings. In C. J. Bailey & R. Shuy (Eds.), *New ways of analyzing variation in English* (pp. 340-373). Washington, DC: Georgetown University Press.

Landau, B., & Gleitman, L. (1985). *Language and experience*. Cambridge, MA: Harvard University Press.

Langer, J. A., Bartolome, L., Vasquez, O., & Lucas, T. (1990). Meaning construction in school literacy tasks: A study of bilingual students. *American Educational Research Journal, 27*, 427-471.

Lorge, I., & Chall, J. (1963). Estimating the size of vocabularies of children and adults: An analysis of methodological issues. *Journal of Experimental Education, 32*, 147-157.

Makkai, A. (1972). *Idiom structure in English*. The Hague: Mouton.

Markman, E., & Hutchinson, J. (1984). Children's sensitivity to constraints on word meanings: Taxonomic versus thematic relations. *Cognitive Science, 16*, 1-27.

McKeown, M. G. (1993). Creating effective definitions for young word learners. *Reading Research Quarterly, 28*, 16-31.

McKeown, M. G. , Beck, I. L., Omanson, R. C., & Pople, M. T. (1985). Some effects of the nature and frequency of vocabulary instruction on the knowledge and use of words. *Reading Research Quarterly, 20*, 522-535.

Mezynski, K. (1983). Issues concerning the acquisition of knowledge: Effects of vocabulary training on reading comprehension. *Review of Educational Research, 53*, 253-279.

Miller, G., & Gildea, P. (1987). How children learn words. *Scientific American, 257*, 94-99.

Naigles, L. (1990). Children use syntax to learn verb meanings. *Journal of Child Language, 17*, 357-374.

Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly, 19*, 304-330.

Nagy, W. E., Anderson, R. C., & Herman, P. (1987). Learning word meanings from context during normal reading. *American Educational Research Journal, 24*, 237-270.

Nagy, W. E., & Gentner, D. (1990). Semantic constraints on lexical categories. *Language and Cognitive Processes, 5*, 169-201.

Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. *Reading Research Quarterly, 20*, 233-253.

Nagy, W. E., McClure, E. F., & Mir., M. (1995). *Linguistic transfer and the use of context by Spanish-English bilinguals* (Tech. Rep. No. 616). Urbana: University of Illinois, Center for the Study of Reading.

Nagy, W. E., & Scott, J. A. (1990). Word schemas: Expectations about the form and meaning of new words. *Cognition and Instruction, 7*, 105-127.

Nelson, K. (1988). Constraints on word learning? *Cognitive Development, 3*, 221-246.

Nunnberg, J. (1978). *The pragmatics of reference*. Bloomington: Indiana University Linguistics Club.

Parry, K. (1993). Too many words: Learning the vocabulary of an academic subject. In T. Huckin, M. Haynes, & J. Coady (Eds.), *Second language reading and vocabulary learning*. Norwood, NJ: Ablex.

Putnam, H. (1975). The meaning of meaning. In H. Putnam (Ed.), *Mind, language, and reality* (pp. 215-271). New York: Cambridge University Press.

Quine, W. (1960). *Word and object*. Cambridge, MA: MIT Press.

Ruhl, C. (1989). *On monosemy: A study in linguistic semantics*. Albany: State University of New York Press.

Schatz, E. K., & Baldwin, R. S. (1986). Context clues are unreliable predictors of word meanings. *Reading Research Quarterly, 21*, 439-453.

Seidenberg, M. S., Tanenhaus, M. K., Leiman, J. M., & Bienkowski, M. (1982). Automatic access of the meanings of ambiguous words in context: Some limitations of knowledge-based processing. *Cognitive Psychology, 14*, 489-537.

Sheffelbine, J. L. (1990). Student factors related to variability in learning word meanings from context. *Journal of Reading Behavior, 22*, 71-97.

Shu, H., Anderson, R. C., & Zhang, H. (1995). Incidental learning of word meanings while reading: A Chinese and American cross-cultural study. *Reading Research Quarterly, 30*, 76-95.

Stahl, S. A. (1986). Three principles of effective vocabulary instruction. *Journal of Reading, 29*, 662-668.

Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research, 56*, 72-110.

Stahl, S. A., Richek, M., & Vandevier, R. (1991). Learning meaning vocabulary through listening: A sixth-grade replication. In J. Zutell & S. McCormick (Eds.), *Learner factors/teacher factors: Issues in literacy research and instruction*. Fortieth Yearbook of the National Reading Conference (pp. 185-192). Chicago: NRC.

Stallman, A. C. (1991). *Learning vocabularies from context: Effects of focusing attention on individual words during reading*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

Sternberg, R. J. (1987). Most vocabulary is learned from context. In M. G. McKeown, & M. E. Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 89-105). Hillsdale, NJ: Erlbaum.

Swinney, D. A. (1979). Lexical access during sentence comprehension: (Re)consideration of context effects. *Journal of Verbal Learning and Verbal Behavior, 18*, 645-659.

Watson, R., & Olson, D. (1987). From meaning to definition: A literate bias on the structure of word meaning. In R. Horowitz & S. J. Samuels (Eds.), *Comprehending oral and written language* (pp. 329-353). New York: Academic Press.

Webster's Third New International Dictionary of the English Language. (1964). Unabridged. Springfield, MA: G & C Merriam Co.

Footnotes

[1]A 133-word subsample was taken by selecting the second entry on page 5 of the dictionary, and on every 20th subsequent page. The method used constitutes a space sampling, and hence may slightly overestimate the number of multiple meaning entries (see Lorge & Chall, 1963). However, essentially the same space sampling method was used by Goulden, Nation, and Read (1990) with no evidence of bias with respect to the frequency of words. The resulting estimates are therefore likely to be reasonably accurate.

[2]Johnson-Laird also mentions a third type of contextual effect, the emphasis of one aspect of a word's interpretation relative to others. This third type of effect is not directly relevant to the present discussion, because it is neutral as to whether the aspects of meaning which are emphasized or de-emphasized are part of the permanent internal representation of a word.